ZL15 series

Power-shift Transmission

SERVICE MANUAL

TORQUE CONVERTOR FACTORY

SHANTUI CONSTRUCTION MACHINERY CO.,LTD.

Brief introduction of Torque Converter Factory Shantui Construction Machinery CO.,LTD.

SHANTUI Hydraulic Torque Converter Factory，a subsidiary of Shantui Machinery CO.，is specialized in manufacturing all kinds of hydraulic torque converter in china . It possesses advanced technology superior equipment, accurate inspection and scientific control on quality .Based on the technology of converter track roller，and carrier roller introduced from Komatsu，Japan in 1980s,and after innovation and improvement, SHANTUI Hydraulic Torque Converter Factory can produce annually 50000 units of torque converter and 60000 pieces of roller will be sold all over the country .The yield of main production base parts of construction machinery and medium and small power bulldozer.

Its main products consists of various hydraulic torque converter applied for construction machinery such as bulldozer，loader etc and oil machinery, track rollers, carrier rollers and idler ass'y series used of crawler machinery such as bulldozer、excavator and tracked paver ,TB80 trimming dozer series and T70,80,T100 track bulldozer series.

Years of experience states that SHANTUI Torque Converter Factory if forwarding depending on technology improvement. under the modern management, SHANTUI Torque Converter Factory renovates and improves aiming at budgeted. This made it take the first place in the fields of construction machinery in china. A system of researching、testing、producing、marketing and servicing has been formed. SHANTUI Torque Converter Factory is highly praised by the mass of customers due to the high-quality products and good service.

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Ⅰ.Main technical data

Rated power : 40～50 kw

Rated speed : 1800～2600 rpm

Control pressure: 1.2～1.5 Mpa

Torque Converter

YJ280 is a single stage, one phase, three organs, and centripetal turbine impeller type hydraulic torque converter.

Main technical specification:

Item	Symbol	Value	Unit
Stall torque ratio	K0	3.7	
Torque at stall when torque converter pump rotates at 1000 rpm	MBg0	29.8	N.m
Torque at state of maximum efficient when torque converter pump rotates at 1000 rpm	MBg η	35.7	N.m
Efficient	η_{max}	0.81	

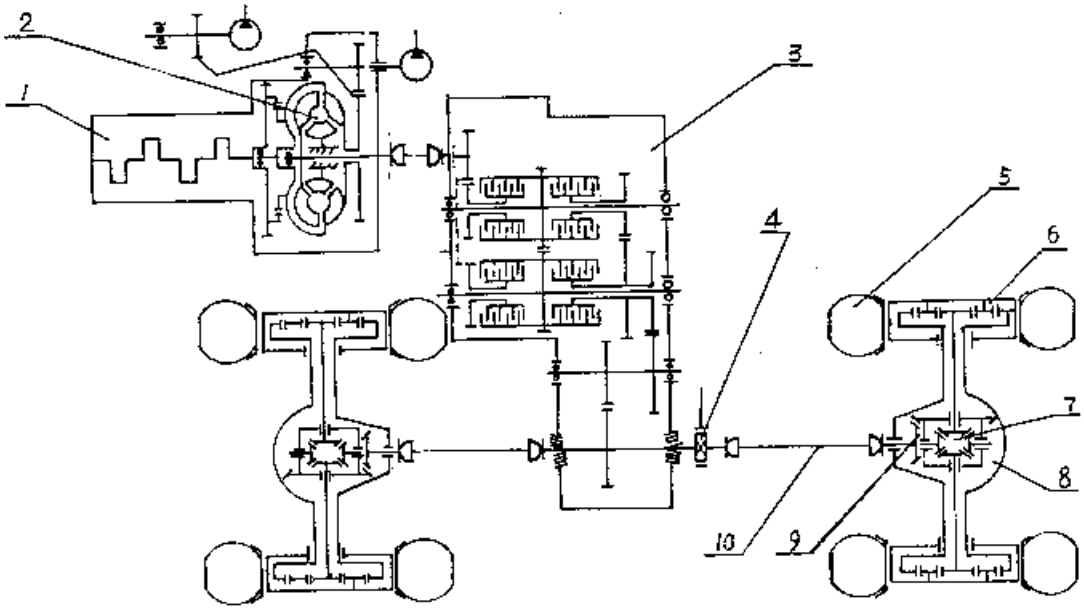
Transmission

Transmission type: Power shift, stable shaft

Transmission ratio:

Forward gear Ⅰ	2.4693
Forward gear Ⅱ	0.8784
Reverse gear Ⅰ	2.5242
Reverse gear Ⅱ	0.8980

Ⅱ. Transmission system

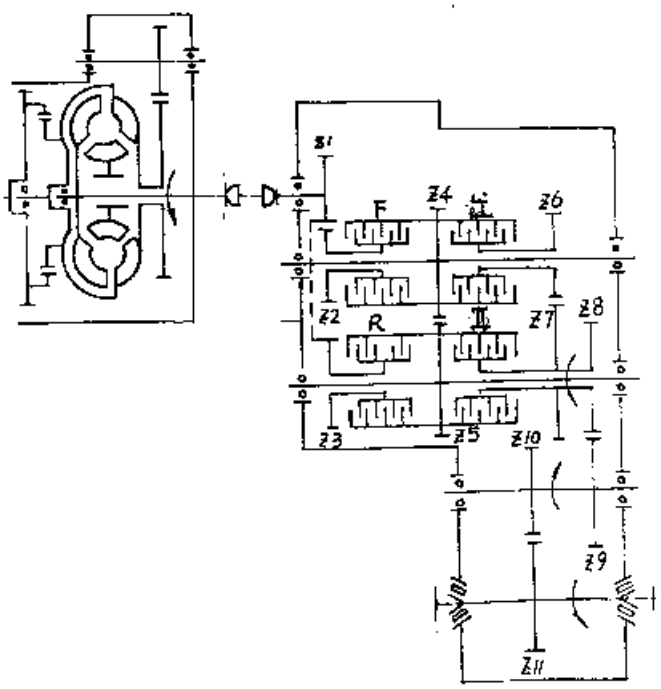


1. Engine 2. Torque converter 3. Transmission 4.Parking brake 5 . Wheels 6. Final drive 7. Differential 8. Driving axles 9. Main drive 10.Driving shaft

The loader driving system consists of hydraulic torque converter, transmission, driving shaft, driving axles. The power from engine is changed torque by torque converter (2) and transmitted to transmission (3) by driving shaft, then transmission change the speed by multi gear and bring different direction and different driving

ratio by different gear grawwing, transmit to driving shaft (10), driving shaft obtain different direction and different speed, so bring forward gear Ⅰ,Ⅱ and reverse gear Ⅰ,Ⅱ. Driving shaft transmit the power to main drive gear (9) of driving axles (8) and final drive (6) through differential (7), so wheel (5) rotating and make the machine driving.

Ⅲ. Working principle



Hydraulic torque converter is a driving equipment using liquid as working medium. The torque is passed with the change of moment of momentum. The following is its working principle. The torque converter pump impeller is connected to the engine's flywheel by input power parts, and it absorbs and converts the mechanical energy into kinetic energy of the working liquid. The turbine absorbs the energy of the working liquid and turns it to the mechanical energy and passes it out by output power parts. Stator changes the flowing direction of the working liquid and gives a reactive torsion, so it can adjust automatically the moment of torsion and the rotational speed. Owning to the special structure and function, it is applied in the construction machinery to adjust out put torque according to the outside loads and to absorb shock. So the torque converter is suitable for the construction machinery at

the towing state and it can prevent the engine from stopping when the load rises suddenly, and it can extend the service life of the engine and the transmission after comfortable operation.

The power from engine is changed torque by torque converter, and transfered to the gear (Z1), which is connected to the turboshaft .

When speed control lever and steering control lever is in middle position (namely neutral), although (Z1),(Z2),(Z3) is engaged, the clutch isn't engaged, gear (Z2),(Z3) is turned for idling, so vehicle is stopped.

When steering control lever is putted in forward position and speed control lever is putted in low-speed position, control pressure oil (1.2～1.4MPa) is putted in the transmission valve , pressure oil from the control valve and put in clutch piston through pipe and forward low-speed cover and oil path of clutch shaft ,oil pressure make piston moving and (F), (Ⅰ) clutch friction plate is engaged. Power is transmitted from the input gear (Z1) through (Z2), (Z6), (Z7), (Z8), (Z9), (Z10), (Z11) to output shaft to realizes forward gear Ⅰ.

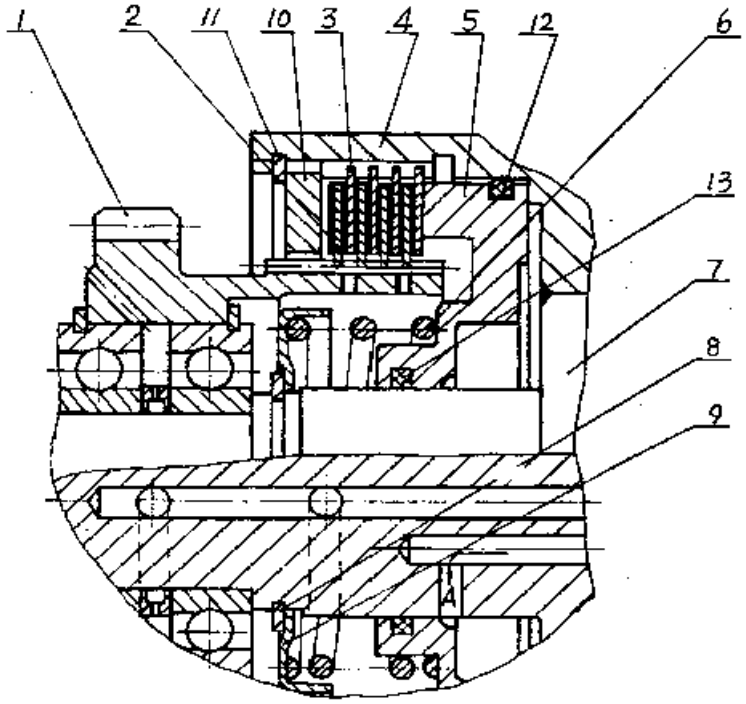
When steering control lever is putted in forward position and speed control lever is putted in high-speed position, the same to gear Ⅰ , pressure oil is putted in clutch piston, oil pressure make piston moving and (F), (Ⅱ) clutch friction plate is engaged. Power is transmitted from the gear (Z1) through (Z2), (Z4), (Z5), (Z8), (Z9), (Z10), (Z11) to output shaft, to realizes forward gear Ⅱ.

The course of reverse gear Ⅰ and reverse gear Ⅱ realizing is same to forward gear, it's not recite depicting. The driving route as follows:

Reverse gear Ⅰ: Power is transmitted from the input gear (Z1) through gear (Z3), clutch (R) ,gear (Z5), (Z4), clutch (Ⅰ), gear (Z6), (Z7), (Z8),(Z9),(Z10),(Z11) to output shaft , to realizes reverse gear Ⅰ.

Reverse gear Ⅱ: Power is transmitted from the input gear (Z1) through gear (Z3), clutch (R) , (Ⅱ), gear(Z8), gear (Z9), (Z10), (Z11) to output shaft, to realizes reverse gear Ⅱ.

Ⅳ. Working principle of clutch



1. Driving gear 2. Driving friction plate 3. Driven friction plate 4. Driven hub 5. Piston 6. Spring 7.Shaft 8,11.V-ring 9.Ring, support 10 .Plate 12 .Prof. seal ring 13. O-ring

The transmission have four clutches, namely forward clutch, reverse clutch, clutch Ⅰ and clutch Ⅱ .The basic compose and working principle of four clutches are same. The above figure is the diagram of clutch.

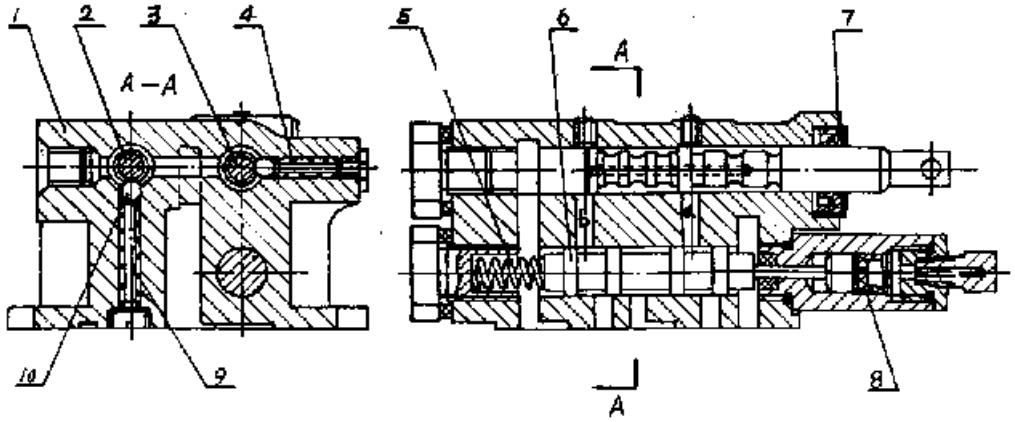
The clutch type is wet clutch. Driven friction plate (2) and driven friction plate (3) have each four plates, outer spline of active gear (1) is connected with inner spline driving friction plate, furthermore can move along it, outer spline of driven friction plate (3) is connected with inner spline of driven hub (4), and also can move on it, one side of spring (6) support left of piston, the other side support shaft (7) by supporting ring (9) and V-ring (8) . when pressure oil is entered in right oil house of piston, the piston resists of force of spring and moving left, all of driving friction plate and driven friction plate are pressed close, the clutch was engaged and power is

transferred.

Ⅴ. Working principle of control valve

Control valve of transmission consists of speed valve, direction valve, cut-out valve and valve body arc..

Speed selection valve consists of speed valve lever (2), spring (9) and steel ball. Pulling lever of the speed selection valve , each speed of gear Ⅰ, neutral and gear Ⅱ is carried out.



1.Valve block 2. Speed selection valve 3. Direction selection valve 4,5,9. Spring 6. Cut-out valve core 7. Seal 8. Cut-out valve piston 10. Steel ball

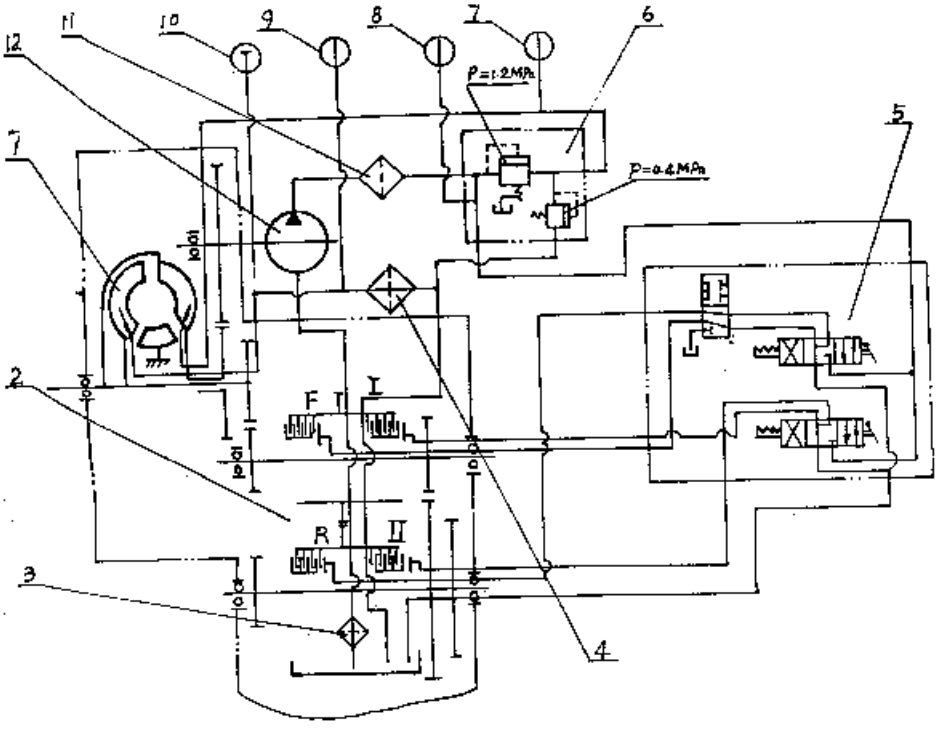
Direction selection valve consists of direction selection valve lever (3), spring (4)and steel ball, pulling the lever of direction selection valve, forward gear , neutral and reverse gear is carried out.

The combination of speed selection valve and direction selection valve can carry out forward gear Ⅰ, Ⅱ and reverse gear Ⅰ, Ⅱ. For example: when pulling out the direction selection lever, pressure oil from main retainer valve is entered in direction selection valve, and entered in forward clutch of transmission by bore A, oil pressure make piston moving and clutch friction plate is engaged, forward gear of transmission is engaged. Forward gear Ⅰ or Ⅱ is engaged if Speed selection valve lever at gear Ⅰ or Ⅱ position. When pushing in the direction selection lever, pressure

oil putted in reverse clutch of transmission by bore B, oil pressure make piston moving and clutch friction plate is engaged, reverse gear Ⅰor Ⅱof transmission is engaged.

Cut-out valve: cut-out valve consists of control valve group, valve core (6), spring (5). When loader traveling on road, cut-out valve at middle position if it doesn't brake, if driver braking that pressure oil from traveling brake system is putted in control valve housing and push down piston (8) moving, valve core is forced to move and pressed spring by moving piston. At this time, the cut-out valve core would cut off the oil path(bore A or B) between direction selection valve and clutch of transmission , the forward or reverse clutch is released and couldn't be transmitted power，in this way , not only benefiting to the loader brake but also all power can be used in implement at the loader shoveling and loading.

Ⅵ. Hydraulic system



1. Torque converter 2. Transmission 3. Oil strainer 4. Cooler 5. Control valve 6.Main modulating valve 7,8,9 . Pressure gauge 10. Temperature gauge 11.Filter 12. Pump

Pump (12) is installed to housing of torque converter on transmission, oil is

sucked from transmission case through strainer (3). Oil from pump is flowed in main modulating valve (6) through filter (11). Now, the oil is distributed in two ways: one way to control valve (5)(oil pressure : 1.2～1.4Mpa), the other way to torque converter (1) through main pressure valve (oil pressure:0.4～0.55Mpa), oil is flowed in two clutches through cooler (4) after the oil is flowed through torque converter(oil pressure:0.15～0.25Mpa), and the friction plate of clutch is lubricated. At last oil is returned to transmission.

Ⅶ. Installation and regulation

Installation

Zl15 transmission assembly matching so well with 495/4100 series of engines in capabilities as to match series of homebred loading machine, and they can be installed to be used straightway. The installation and orientation rely on the dimension of ϕ47f6 on mantling wheel axes to be united with flywheel of the engine. The power is transferred by the engine fly wheel locked with stretch board by twelve bolts, zl15 transmission assembly is connected with the shell of engine flywheel by nine bolts so as to be riveted in the forepart. The gear-box is connected with bodywork by bracket at double deck so as to be riveted in the back part. Some colloid mat and some adjustive mat will be used between them, or else, it will effect the normal work of transmission。

Regulation

Startup the engine, checkup and regulate the oil way system after the oil pump begin work, regulate the oil pressure of shifting at 1.2~1.4 Mpa, at the same time, the cracking pressure of relief valve on the torque converter is 0.4~0.55 Mpa, the lubricating oil pressure in transmission will be 0.15~0.25 Mpa, the shifting handspike and the organization that to be connected with must be agility, any locking

phenomenon must to be avoided, and the shifting position must be nicety and obviously. Treadle down the brake, and turn engine accelerograph to the maximal, the vehicle must not start, and loosen the tread board, the vehicle must start right now. The cheer lever must in the dipstick direction extension, and regulate organization connected with brake so as to make the arrester worked well.

Ⅷ Maintenance

Oil quality:

Zl15 transmission system uses SAE10W-30, No.6 driving oil or No.22 turbine oil, the cheer lever must in the dipstick direction extension, and it must be higher than the oil purifier after the torque converter and pipeline full of oil. The oil must be clean; any impurity must be avoided drastically.

Oil temperature and pressure

The oil temperature should not be over than 95 centigrade after a long time work, and it should not be over than 120 centigrade after a short time work, or else, the vehicle must be stopped and should be checked over, or else, the seal ring will be destroyed, so the oil will be leaked. The oil pressure of expiation in torque converter and that of outlet, or shifting pressure in control valve, must be in the required range.

Oil change

The oil in new vehicle must be changed entirely after working for 50 hours, and since then the oil must be changed again every one thousand hour’s work or each year’s work at least.

Cleanout

The oil strainer on transmission must be cleaned after the first 50 hour's work, and since then it must be cleaned after every 500 hour's work, and it must be changed in time if there is something destroyed. Pay attention to see if there is any chipping of aluminum, iron, or copper, in order to analyze that circs abrasion for accessories in wheel box and torque converter, or if there is something failure, measure should be taken.

Ⅸ. Familiar troubles and remedies

Troubles and remedies about hydraulic torque converter

Trouble	Reason	Remedy
The power output is low	The rotational speed of engine is down	Increase the speed of engine
	Some gas in oil	Check oil level in oil case Check leakproofness Check whether oil is ineffective
	The temperature of oil is too high	Reduce the oil temperature
	The input or output oil pressure is too low	Check leakproofness and whether the valve work right
Temperature of oil is too high	Work time at low efficiency is too long	Decrease loads or raise the speed of engine
	Oil level is low in oil case or there some gas in oil	Refill oil, Check leakproofness Check whether oil is ineffective.
	Oil kind is not suitable	Change oil type.
	The oil pressure is too low	Repair or change the valve. Increase the oil pressure.
	Water lever in cooling system is too low	Check water case and refill water
	It can't supply enough oil.	Check the oil input system.
The oil pressure is	Back pressure valve doesn't work.	Change the back pressure valve.
	Input pipe is jammed.	Check input pipe.

too low	Pump can't supply enough oil.	Repair or change the pump.
	Oil seal is damaged.	Chang a new oil seal.
	Oil lever in oil tank is too low	Refill oil.
	Strainer is clogged	Change strainer
	Pressure gage doesn't work .	Change a new pressure gauge.
Oil leak	Oil Seal is worn. O-ring is worn.	Change a new oil seal Change a new O-ring

Familiar trouble and remedies of transmission

Trouble		Reason	Remedy
Transmission And hydraulic circuit	No gearing	1. Gear position is inexact 2. Clutch piston leakage 3. Pressure of speed changing is low 4. Oil-piping are blocked	1. Put gear lever to right position or check control value 2. Check or change O-ring 3. See as following 4. Dismantle and clean and dredge
	Pressure of speed-changing is low	1. Modulating value is not adjustable or spring break off 2. Oil level of transmission is low 3. Case strainer or oil path is blocked 4. Oil leakage from clutch 5. Transmission pump is defective	1. Adjust or replace spring 2. Add oil to the mark of dipstick 3. Clean or dredge 4. Change O-ring 5. Check or change

	Oil temperature is too high	1. Work-time is too long 2. Oil too much or too less 3. Clutch slide 4. Clutch could not be disengaged	1. Stop or idle for a few time 2. Add oil to overflow hole 3. Check oil pressure and seal ring 4. Check clutch control oil piping or position of control lever
	Oil pressure of one of gears is low	1.O-ring of the piston of the gear is damaged 2.Seal ring of the oil piping is damaged 3.Oil piping leakage oil or blocked	1. Change O-ring of piston 2. Change seal ring 3. Check and remedy
	Gear in disorder	Seal ring on shaft end leakage	Change seal ring
	System release oil	1. Joint is loose 2. Seal ring is damaged	1. Tighten joint 2. Change seal ring

Ⅹ. Wearing Parts

Torque converter

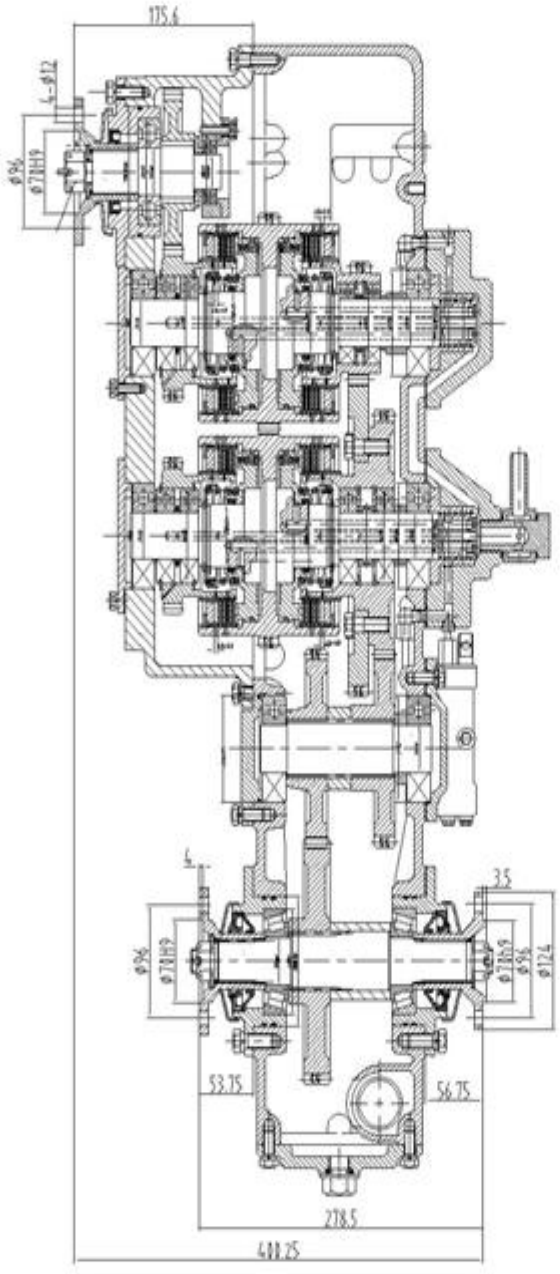
Index No.	Part No.	Description	Q'ty	Remark
1	YJ265-00014	Ring, seal	1	50
2	ZL30D-11-19	Ring, seal	2	80
3	ZL30D-11-54	O-ring	1	
4	GB1235-76	O-ring	1	ϕ130x3.1
5	GB3452.1-82	O-ring	1	ϕ290x3.5
6	07000-02085	Seal, oil	1	ϕ85x2.5

Transmission

Index No.	Part No.	Description	Q'ty	Remark
1	07000-02085	O-ring	1	ϕ85x3.5
2	07000-03032	O-ring	3	ϕ32x3.5
3	07000-02105	O-ring	5	ϕ105x3.1
4	10Y-15-00015	Ring, seal	6	
5	07002-02434	O-ring	1	ϕ20.7x3.4
6	BD05-01103	Ring, seal	4	
7	GB3452.1-82	O-ring	4	ϕ53x5.3
8	JB982-77	Combination washer	2	10

9	JB982-77	Combination washer	1	48
10	JB982-77	Combination washer	4	27
11	07012-70048	Seal, oil	1	48
12	130-2402052	Seal, oil	2	
13	130-2402050	Oil plate	2	

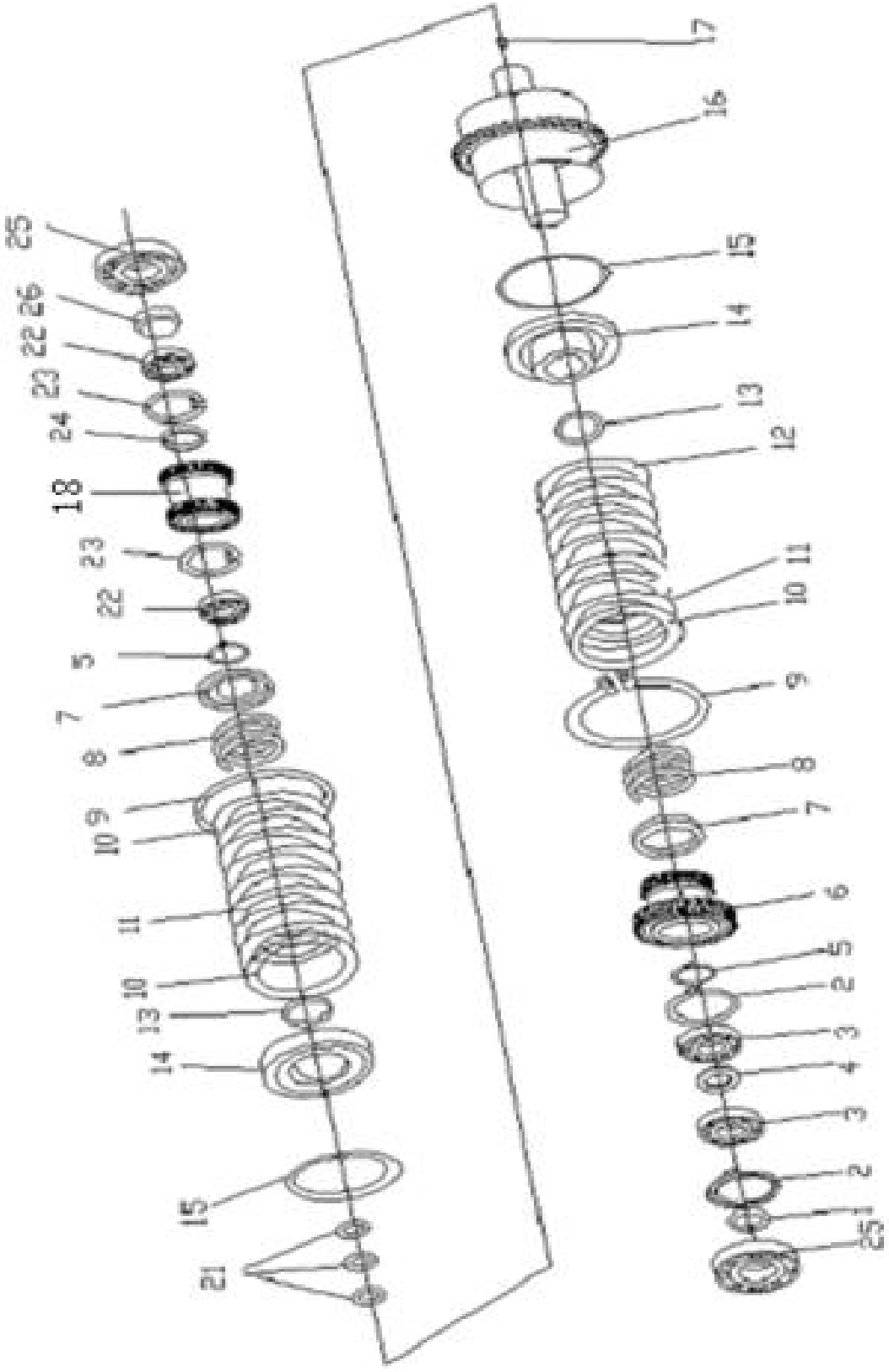
Ⅺ. Overall diagram



附录

1. 零件目录 Parts Lists

a.前进低档离合器 Forward-Low Clutch

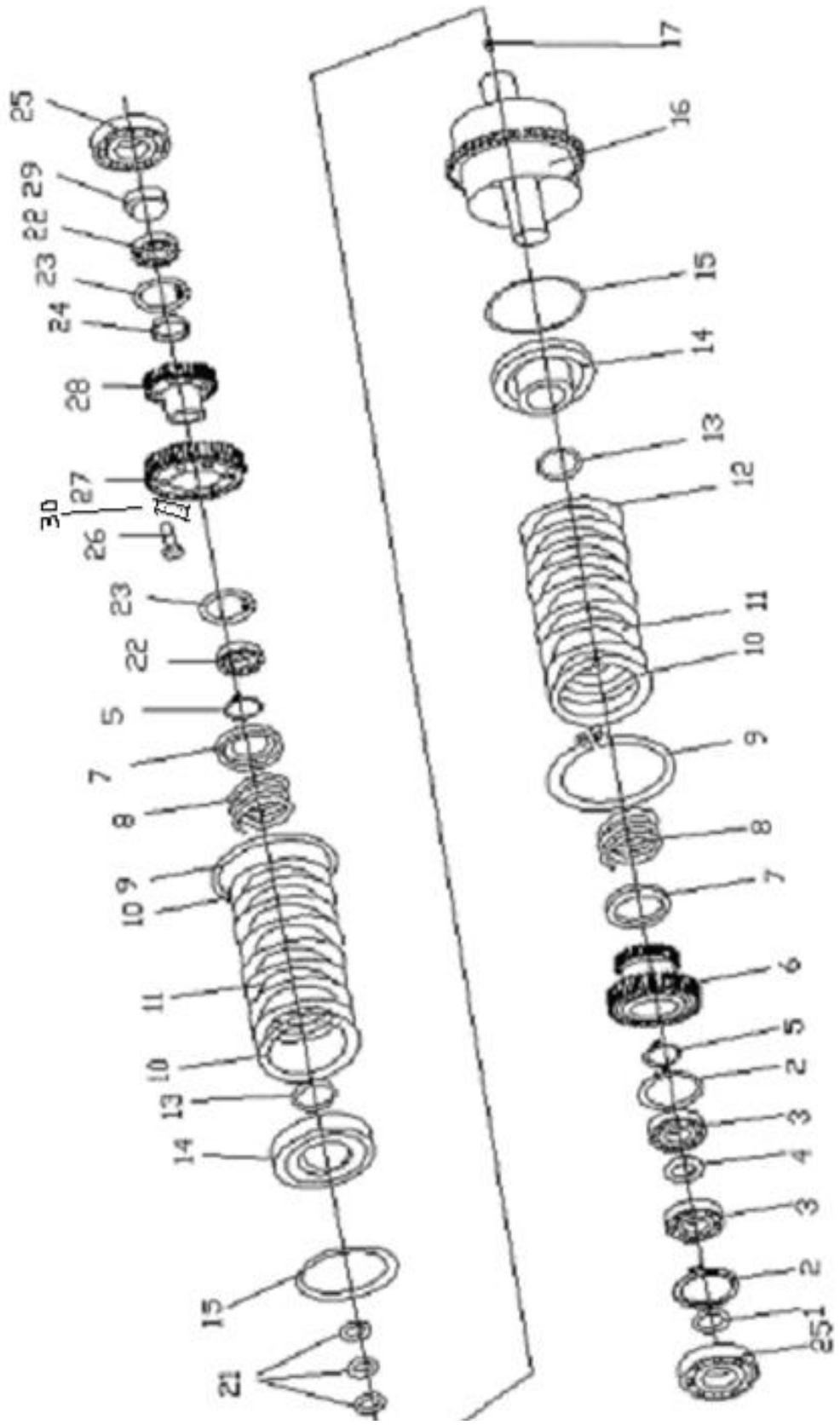


a.前进低档离合器 Forward-Low Clutch

序号 No.	代号 Code	名称 Description	数量 Qty.	备注 Remark
1	BD05-01012	挡圈 Snap ring	1	
2	BD05-01011	挡圈 Snap ring 80	2	
3	GB277-82	轴承 50208 Bearing	2	
4	BD05-01001	挡圈 Snap ring	1	
5	GB894.1-86	挡圈 Snap ring 50	2	
6	BD05-01002	齿轮 Gear	2	
7	BD05-01010	弹簧支承座 Spring-support seat	2	
8	BD05-01005	离合器弹簧 Clutch spring	2	
9	GB893.1-86	挡圈 Snap ring150	2	
10	BD05-01003	离合器活塞压板 Pressure plate Of clutch piston	2	
11	BD05-01004	垫板 Saucer	8	
12	BD05-01300	磨擦片 Friction disc	8	
13	GB3452.1-82	O 型圈 O-ring 53×5.3	2	

14	BD05-01101	活塞 Piston	2	
15	BD05-01103	密封环 Airproof ring	2	
16	BD05-01200	前进低档离合器壳体 Forward-low clutch case	1	
17	07043-00108	螺塞 Plug	2	
21	10Y-15-00015	密封环 Airproof ring	3	
22	GB276-82	轴承 Bearing 308	2	
23	GB893.1-86	挡圈 Snap ring 68	2	
24	BD05-01009	挡环 Snap ring	1	
25	GB276-82	轴承 Bearing 308	2	
26	BD05-01009	挡环 Snap ring	1	

b.倒退高档离合器 Astern-High Clutch

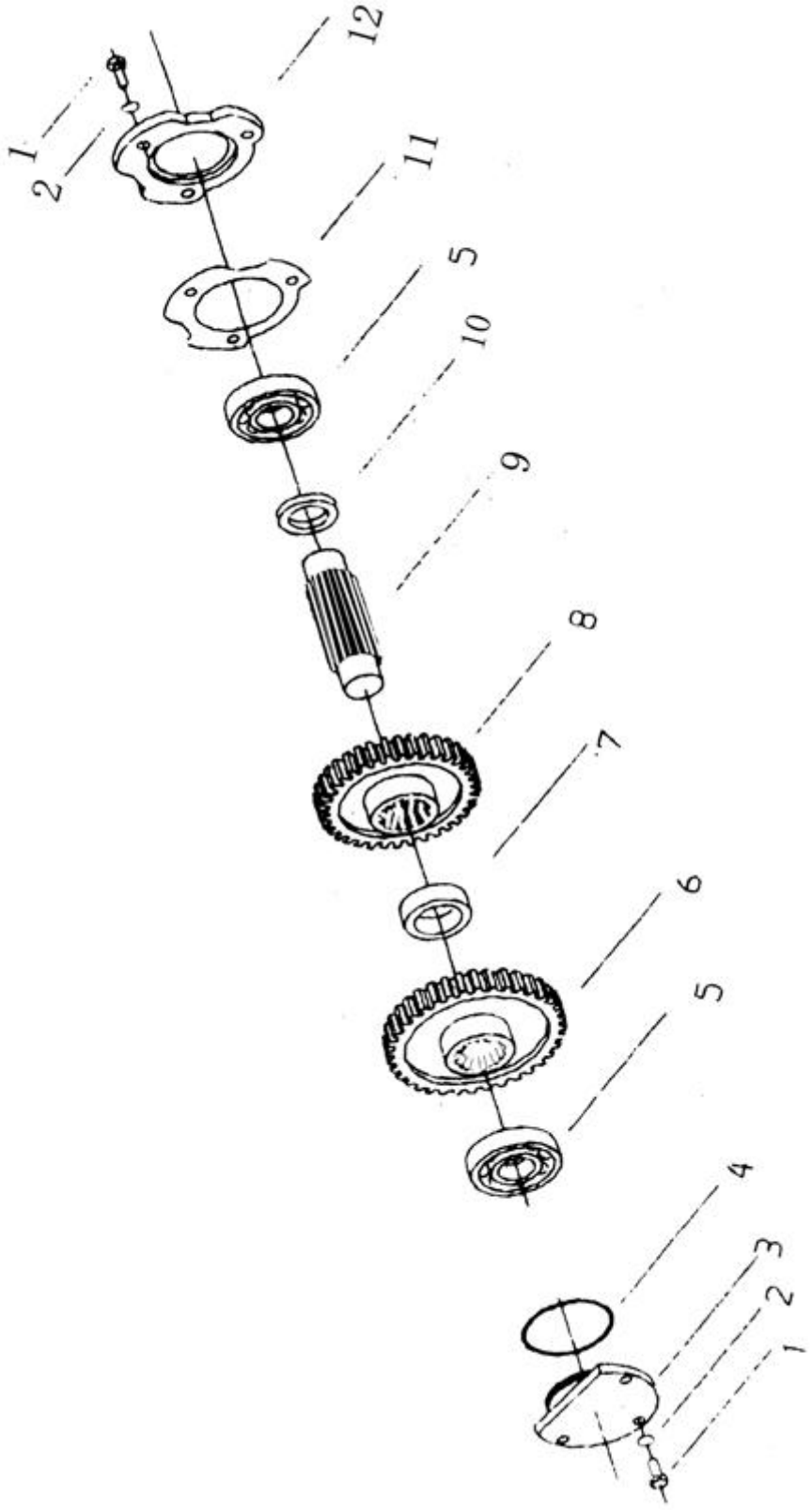


b.倒退高档离合器 Astern-high Clutch

序号 No.	代号 Code.	名称 Description	数量 Qty.	备注 Remark
1	BD05-01012	挡圈 Snap ring	1	
2	BD05-01011	挡圈 Snap ring80	2	
3	GB277-82	轴承 50208 Bearing	2	
4	BD05-01001	挡圈 Snap ring	1	
5	GB894.1-86	挡圈 Snap ring50	2	
6	BD05-01002	齿轮 Gear	1	
7	BD05-01010	弹簧支承座 Spring -support seat	2	
8	BD05-01005	离合器弹簧 Clutch spring	2	
9	GB893.1-86	挡圈 Snap ring150	2	
10	BD05-01003	离合器活塞压板 Pressure plate Of clutch	2	
11	BD05-01004	垫板 Saucer	8	
12	BD05-01300	磨擦片 Friction disc	8	
13	GB3452.1-82	O 形圈 O-ring 53×5.3	2	

14	BD05-01101	活塞 Piston	2	
15	BD05-01103	密封环 Airproof ring	2	
16	BD05-02100	倒退高档离合器壳体 Forward-low clutch case	1	
17	07043-00108	螺塞 Plug	2	
21	BD05-01008	密封环 Airproof ring	3	
22	GB276-82	轴承 Bearing 308	2	
23	GB893.1-86	挡圈 Snap ring68	2	
24	BD05-02001	挡环 Snap ring	1	
25	GB276-82	轴承 Bearing 308	2	
26	01014-31235	螺栓 Bolt M12×35	6	
27	BD05-02201	齿轮 Gear	1	
28	BD05-02202	齿轮 Gear	1	
29	BD05-02002	挡环 Snap ring	1	
30	BD05-02002	止动垫 washer		

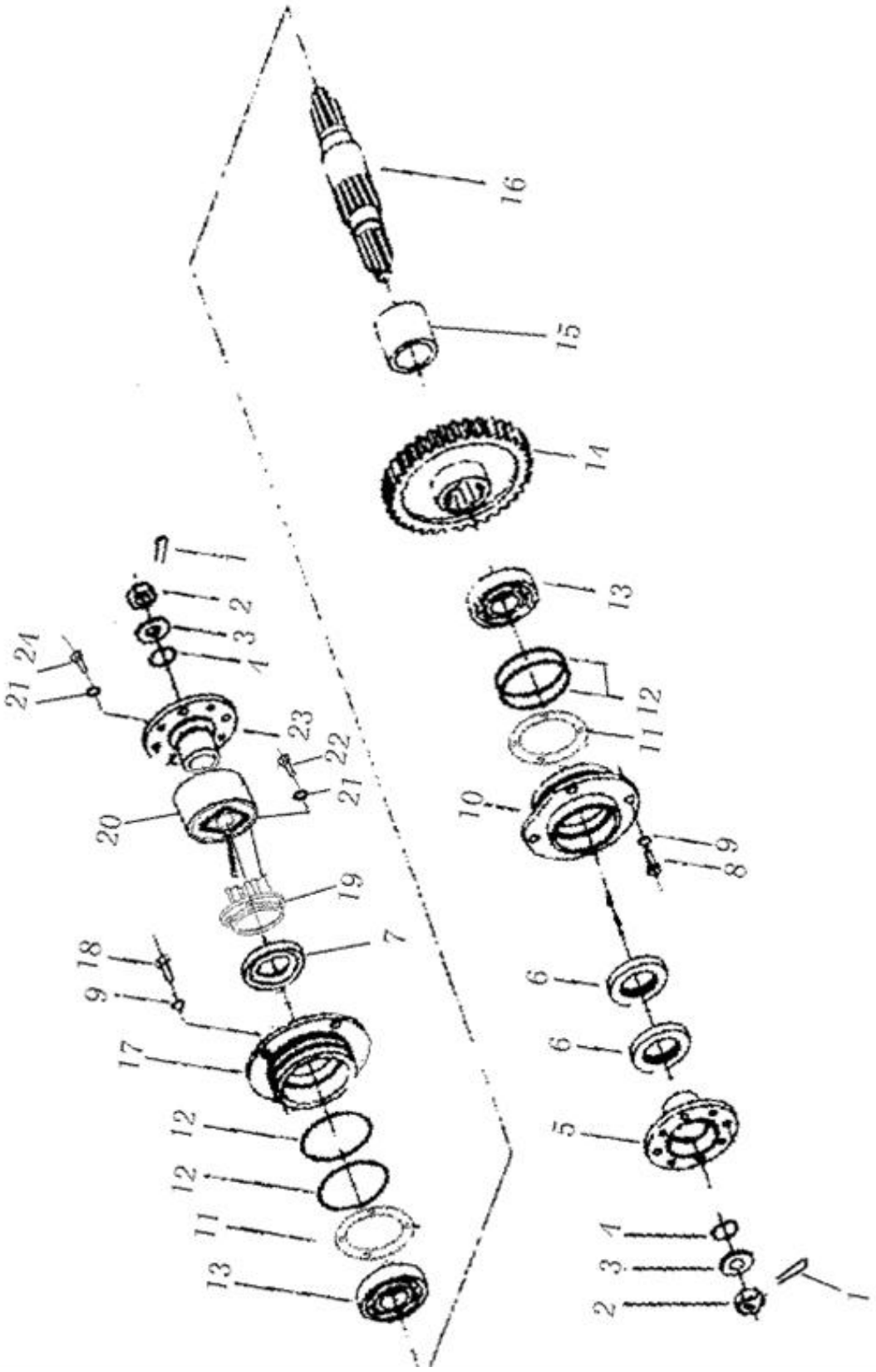
c.中间轴部件 Intermediate Shaft Assembly



c.中间轴部件 Intermediate Shaft Assembly

序号 No.	代号 Code.	名称 Description	数量 Qty.	备注 Remark
1	01010-31025	螺栓 BoltM10X25	6	
2	01602-11030	垫圈 Washer 10	6	
3	BD05-00018	端盖 End-cover	1	
4	07000-02085	O 型圈 O-ring 85×2.5	1	
5	GB276-82	轴承 Bearing308	2	
6	BD05-00017	齿轮 Gear	1	
	BDS05-00017	齿轮 Gear	1	厦工型
7	BD05-00019	隔套 Snap cover	1	
8	BD05-00002	齿轮 Gear	1	
9	BD05-00003	中间轴 Intermediate Shaft	1	
10	BD05-00005	隔套 Snap cover	1	
11	BD05-00006	垫 Washer	1	
12	BD05-00004	端盖 End-cover	1	

d.输出轴部分 Output Shaft Assembly

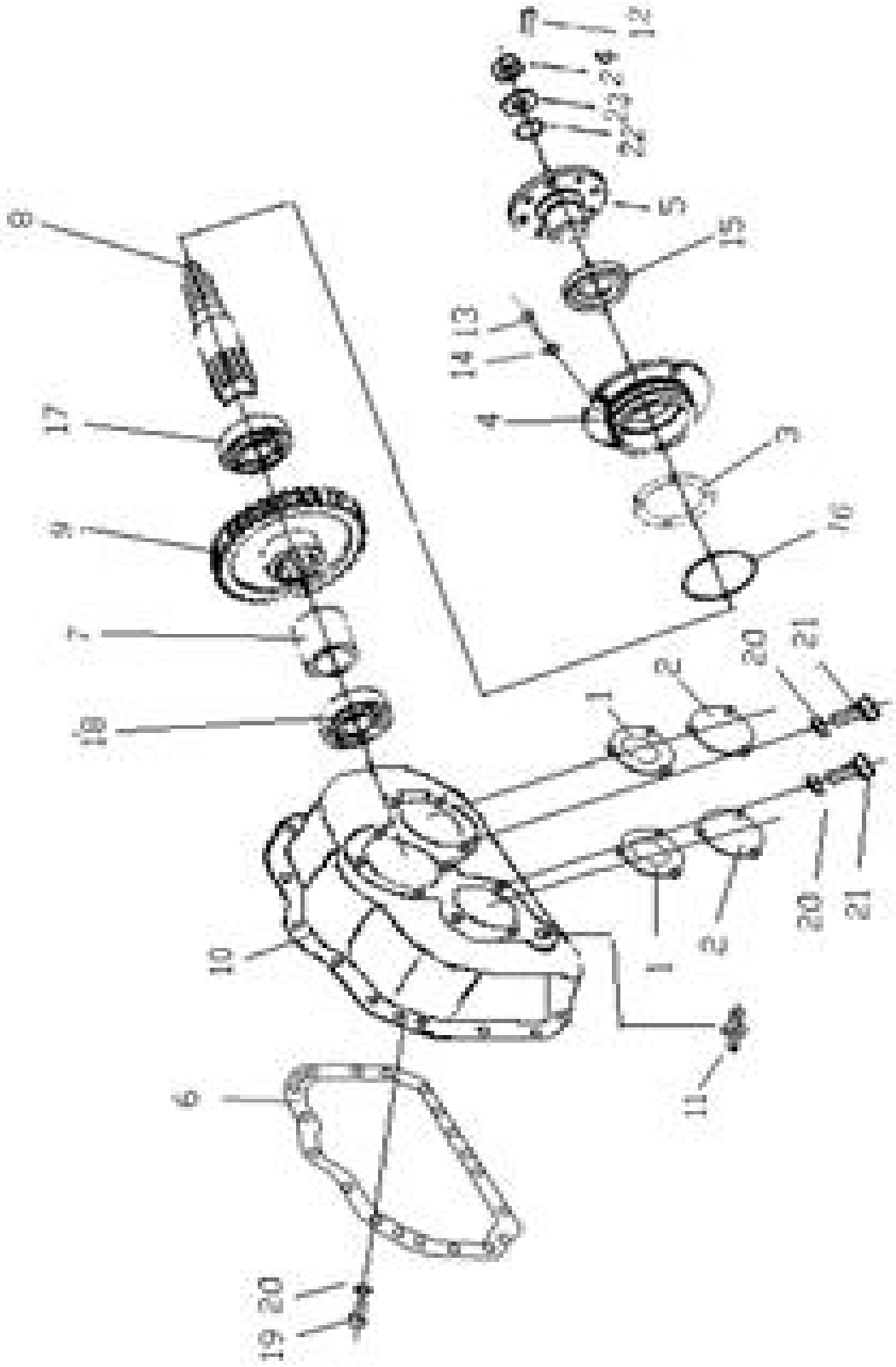


d.输出轴部分 Output Shaft Assembly

序号 No.	代号 Code.	名称 Description	数量 Qty.	备注 Remark
1	04050-04030	开口销 Split pin	2	
2	BD05-00010	螺母 Nut	2	
3	BD05-00011	大垫圈 washer	2	
4	07000-03032	O 形圈 O-ring	2	
5	BD05K-03000	法兰 Flange	1	
6	BAU48-70-10	骨架油封 Oil seal	8	
7	07012-70050	骨架油封 Oil seal	1	
8	01010-31225	螺栓 BoltM12X25	8	
9	01602-11236	垫圈 washer 12	8	
10	BD05-00008	轴承座 Bearing seat	1	
11	BD05-00014	调整垫 Tap	6	
12	07000-02105	O 形圈 O-ring	4	
13	GB297-84	轴承 Bearing 7308E	2	
14	BD05-00016	齿轮 Gear	1	
15	BD05-00007	隔套 Snap cover	1	
16	BD05L-00003	输出轴 export shaft	1	

17	BD05L-00002	轴承座 Bearing seat	1	
18	01010-31235	螺栓 BoltM12X35	4	
19	ZL15E-00002	制动器支座 Arrester seat	1	
20	DFX.2-15A	制动器总成 Arrester	1	
21	01602-01030	垫圈 washer 10	1	
22	GB70-85	螺栓 BoltM10X30	4	
23	BD05K-00001	法兰 Flange	1	
24	01010-31025	螺栓 M10X25	8	

e.输入部分 Import Assembly

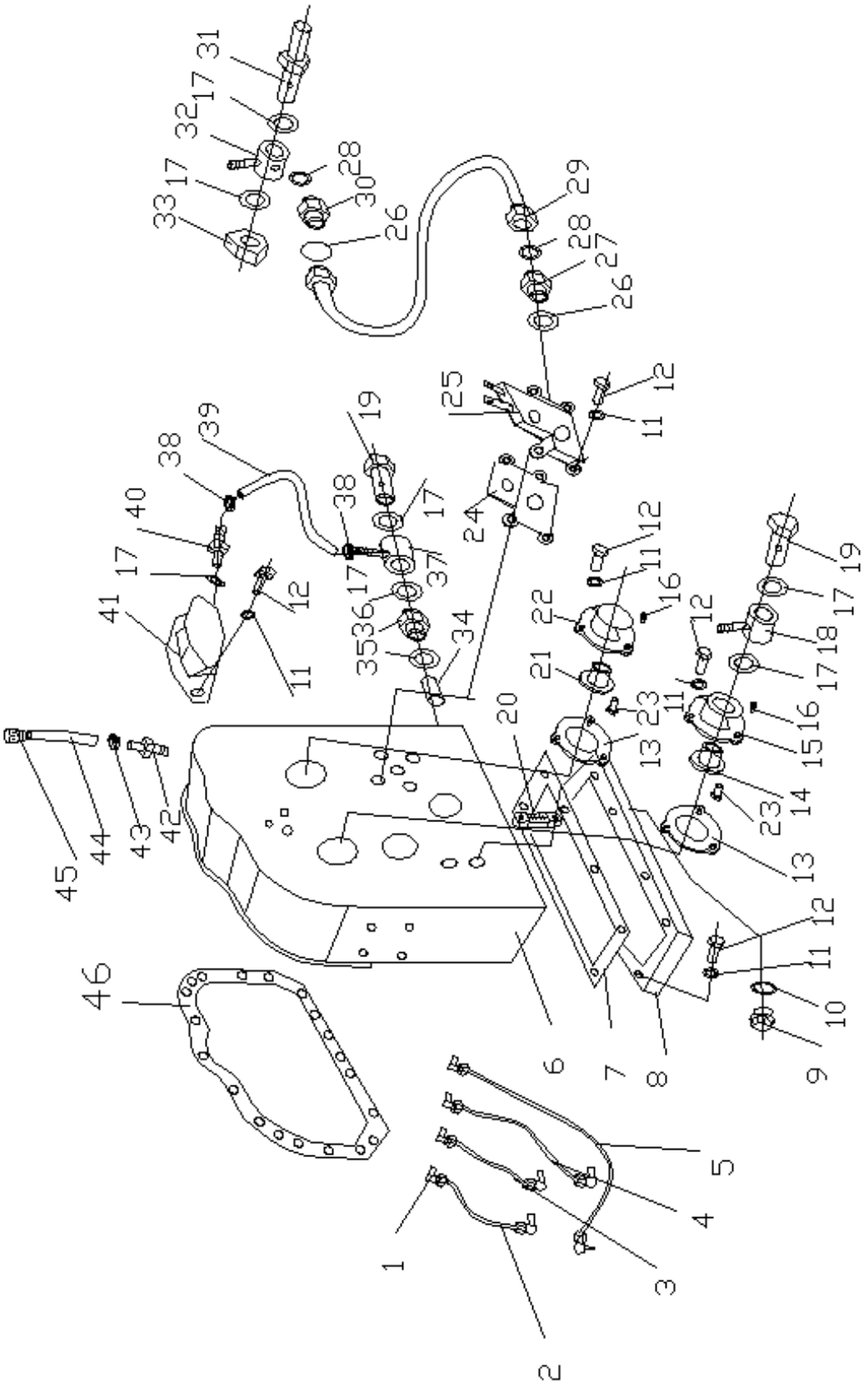


e.输入部分 Import Assembly

序号 No.	代号 Code.	名称 Description	数量 Qty.	备注 Remark
1	BDX05-00001	轴承盖 Bearing cover	2	
2	BDX05-00002	垫片 washer	2	
3	BDX05-00003	垫片 Washer	1	
4	BDX05-00004	轴承座 Bearing seat	1	
5	BDX05-01000	输入法兰盘 Import Flange	1	
6	BDX05-00006	密封垫 Washer	1	
7	BDX05-00008	调整垫 Tap	1	
8	BDX05-00009	输入轴 Import shaft		
9	BDX05-00010	齿轮 Gear	1	
10	BDX05-00011	传动箱壳体 Wheel-box case	1	
11	BDX05-00012	管接头 Tie-in	1	
12	04050-04030	开口销 Split pin	1	
13	01010-31230	螺栓 BoltM12X30	4	

14	01602-11236	垫圈 Washer 12	4	
15	BAU48-70-10	骨架油封 Oil seal	1	
16	07000-02105	O 型圈 O-ring 2.5X105	1	
17	GB276-82	轴承 Bearing308	1	
18	GB276-82	轴承 Bearing106	1	
19	01010-31030	螺栓 Bolt M10X30	15	
20	01602-11030	垫圈 Washer 10	21	
21	01010-31025	螺栓 BoltM10X25	6	
22	07000-03032	O 型圈 O-ring 3X32	1	
23	01643-32260	大垫圈	1	
24	BD05-00010	螺母 Nut	1	

f.箱体及管路附件 Housing-Assembly



f.箱体及油路附件 Housing-Assembly

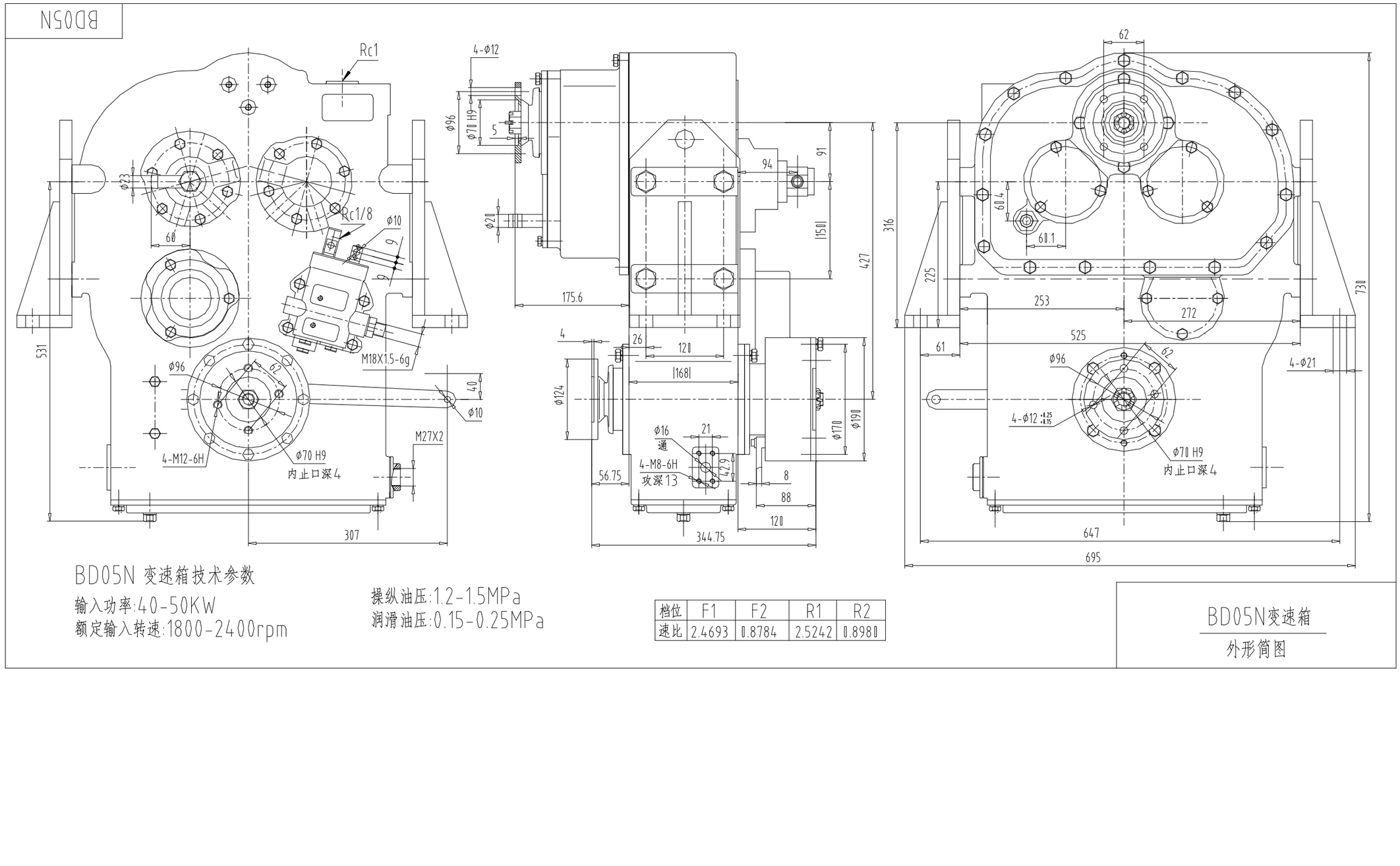
序号	代号	名称	数量	备注
1	BD05-00024	弯管接头 Tie-in	8	
2	BD05-08000	管 Pipe	1	
3	BD05-09000	管 Pipe	1	
4	BD05-10000	管 Pipe	1	
5	BD05-11000	管 Pipe	1	
6	BD05-00001	壳体 Case	1	
7	BD05-00013	垫 Washer	1	
8	BD05-00012	底板 End-plate	1	
9	07044-12412A	螺塞 Plug	1	
10	07002-02434	O 形圈 O-ring	1	
11	01602-11030	垫圈 Washer10	22	
12	01010-31025	螺栓 BoltM10×25	22	
13	BD05-03004	垫片 washer	2	
14	BD05-03001	衬套 Bush	1	
15	BD05-03002	盖 Cover	1	
16	07043-00108	螺塞 Plug	5	
17	JB982-77	组合密封垫圈 27 Assembly washer	7	
18	ZL15C-20000	接头 Tie-in	1	
19	ZL15B-00001	螺栓 Bolt	2	

20	YWZ-80T	油位指示器	1	
20a	BD05L-00006（JB982-77）	放水阀（组合垫 10）drain value		
21	BD05-04002	衬套 Bush	1	
22	BD05-04001	盖 Cover	1	
23	BD05-03003	螺钉 Bolt	6	
24	BD05-00025	垫 Washer	1	
25	ZL15D	变速箱操纵阀 Manipulative	1	
26	JB982-77	组合密封垫圈 18 Assembly washer	2	
27	转向器 1 号 GB-4	接头 Tie-in	1	
28	07000-01008	O 形圈 O-ring	2	
29	JF300-81WWAWI-125	软管 Pipe	1	
30	ZL15A-00015	管接头 Tie-in	1	
31	ZL15C-00005	接管 Tie-in	1	
32	ZL15C-30000	接头 Tie-in	1	
33	ZL15A-00013	螺母 Nut	1	
34	BD05-13000	滤油器 Filter	1	
35	JB982-77	组合密封垫圈垫 48 Assembly washer	1	
36	BD05-00027	螺塞 Plug	1	

37	ZL15B-01000	密封垫 Washer	1	
38	07281-00289	喉箍 Hoop	2	
39	HG4-761-74	软管 Pipe 19×1000	1	
40	ZL15C-00004	接头 Tie-in	1	
41	CBC25-FLX	齿轮泵 Gear pump	1	
42	BD05-00022	管接头 Tie-in	1	
43	07281-00489	喉箍 Hoop	1	
44	07260-02645	软管 Pipe	1	
45	BD05-00021	管盖 Pipe cover	1	
46	ZL15A-00006	垫 Washer	1	
47	BDS05-13000	加油管 Oil pipe	1	

附录一:BD05N 变速箱外型简图

Addenda 1:BD05N diagram



BD05N 变速箱技术参数

输入功率:40-50KW

额定输入转速:1800-2400rpm

操纵油压:1.2-1.5MPa

润滑油压:0.15-0.25MPa

档位	F1	F2	R1	R2
速比	2.4693	0.8784	2.5242	0.8980

BD05N变速箱

外形简图

山推工程机械股份有限公司液力变矩器厂